Editorial commentary: "*Does a Nasal Airway Facilitate Nasotracheal Intubation or Not?*"

Kashish Garg, Ajay Singh, Shiv Lal Soni

Department of Anaesthesia & Intensive care, Post Graduate Institute of Medical Education and Research, Chandigarh, India

Correspondence to: Shiv Lal Soni. Assistant Professor, Department of Anesthesia & Intensive care, Post Graduate Institute of Medical Education and Research, Chandigarh 160012, India. Email: dr.shivsoni@gmail.com.

Comment on: Canpolat DG, Orbay Yasli S. Does a Nasal Airway Facilitate Nasotracheal Intubation or Not? A Prospective, Randomized, and Controlled Study. J Oral Maxillofac Surg 2021;79:89.e1-9.

Received: 18 December, 2021; Accepted: 06 January, 2022; Published: 30 September 2022.

doi: 10.21037/joma-21-24

View this article at: https://dx.doi.org/10.21037/joma-21-24

Nasotracheal intubation is commonly used in oromaxillary surgery patients as it provides good surgical access. It involves the passage of the endotracheal tube (ETT) through the nose. There are two pathways along which the tube can be passed through the nose, upper and lower pathway (1,2). The upper pathway lies between the inferior turbinate and middle turbinate. The lower pathway lies between the floor of the nose and the inferior turbinate. The lower pathway is safer in comparison to the upper pathway because the lower pathway is away from the cribriform plate and middle turbinate. Also, there are fewer chances of epistaxis associated with it (1,2).

Nasotracheal intubation is more traumatic than oropharyngeal intubation as it causes trauma to nasopharyngeal mucosa. Numerous techniques have been described in the literature to make it less traumatic such as nasal airway preparation with vasoconstrictors (adrenaline, xylometazoline), selection of most patent nostril, use of the small ETT, use of thermosoftened tube, proper lubrication of ETT and nasopharynx, the shape of ETT tip, progressive dilatation of nasopharyngeal pathway with nasopharyngeal airway, telescoping the ETT into rubber catheter, use of gastric or suction tube as a guide, use of an appropriate technique with appropriate force and attempts when resistance is encountered during ETT advancement (3-5).

The most common complication associated with nasotracheal intubation is epistaxis occurring due to Kiesselbach's plexus injury in the anterior nasal septum (6). This complication can be avoided by keeping the bevel tip of an ETT to the lateral side of the nostril (6). During nasotracheal intubation, resistance is most commonly encountered at the level of turbinates and posterior nasopharynx. In a study done by Adamson *et al.* (7), it was shown that repeated dilatation of nasal cavity with nasopharyngeal airway causes the friable nasal mucosa to bleed more, leading to increased haemorrhage in the nasopharyngeal dilated group. Smooth transition of an ETT through the nasal cavity also helps in reducing epistaxis (3). In this study, epistaxis was the most common complication (8). However, nasopharyngeal airway use did not reduce nor increase this complication. In a recent randomised controlled study done by Dhakate *et al.* (3), the use of nasopharyngeal airway decreased the severity and incidence of bleeding associated with nasotracheal intubation.

Some other complications associated with it are sinusitis, superficial necrosis of nasal ala, bacteremia, middle turbinectomy, olfactory nerve injury, inferior turbinate ulceration, cerebrospinal fluid (CSF) rhinorrhea resulting from cribriform plate fracture, retropharyngeal perforation and intracranial placement (1,6). Using appropriate sized ETT without using excessive force during nasotracheal intubation can prevent most of the traumatic complications. Bacterial transfer can occur from the nasal cavity to the trachea via the ETT, which can be prevented by antibiotics, sheathing of the tube tip with soft material, prior application of mupirocin ointment into the nasal cavity, removal of nasal dirt from ETT tip during direct laryngoscopy before advancing the ETT into the trachea (1,6).

The overall objective of this study is to evaluate whether nasal airway use just before nasotracheal intubation facilitates intubation or not (8). The use of nasal airways to facilitate nasotracheal intubation dates back to 1986 by Lewis (9). The nasal airway traverses the nasopharynx and dilates the nasal cavity atraumatically, and facilitates the application of lubricating agents into the nasal cavity (9). Nasopharyngeal airways are better tolerated in semiconscious or awake patients as they do not cause a gag reflex (10). They also assist with patient's oxygenation and ventilation in the difficult bag and mask ventilation, act as a bridge before definitive airway is secured (10). This study also observed that mask ventilation was easier in the nasopharyngeal airway group as compared to the control group (8).

In this study, one group was intubated nasally without any use of nasal airway and the other group was intubated nasally after the dilatation of the nasal cavity by nasal airway (8).

This study aims to compare the duration of intubation, number of attempts, the difficulty of ventilation and complications (epistaxis, hoarseness, sore throat) between the two groups (8).

In this study, the selection of nostril for nasopharyngeal airway dilatation was assessed preoperatively by asking patients through which nostril they breathe better (8). Several tests are available to check the patency of the nostril for nasotracheal intubation. Thongrong *et al.* (4) compared the simple occlusion test with the spatula test to select nostril for nasotracheal intubation. In the occlusion test, the patient was asked for his self-assessment through which nostril they breathe better when another nostril is occluded in a sitting position. In the spatula test, patterns of condensation from each nostril upon spatula was determined for airway patency. Findings of both tests were compared with nasal endoscopy (gold standard technique). It was found out that the occlusion test is better in diagnosing nasal airway patency than the spatula test. In a systemic review and meta-analysis done by Tan *et al.* (11), as compared to the left nostril, the right nostril was found more appropriate, associated with less severity and incidence of epistaxis and less intubation time for nasopharyngeal intubation. In a study done by Cho *et al.* (12), they determined whether preoperative rhinological assessment (dental CT scan and nasal endoscopy) and pretreatment reduce nasal trauma and complications such as epistaxis and nasal obstruction in patients posted for jaw surgery with nasotracheal intubation. They find out that rhinological evaluation and preoperative management significantly reduce complications associated with nasotracheal intubation when compared with a simple pre-induction test of checking and asking for better airflow through each nostril by an anaesthetist.

In this study, a mixture of 2% (1 mL) lidocaine and 0.1% (1 mL) epinephrine was administered on both sides with the help of an atomiser after induction for dilatation and preparation of nasal cavity in both groups. In a randomised controlled trial done by Patel *et al.* (13), they compared 0.1% xylometazoline nasal drops with 1:10,000 epinephrine merocele nasal packing. They found out that xylometazoline significantly reduces the incidence of severe bleeding and post-extubation bleeding. In a study done by Song (14), the author compared xylometazoline spray with 0.01% epinephrine packing, and it was found out that the xylometazoline group was associated with less epistaxis during intubation. However, no difference was observed in epistaxis 5 min after intubation and postoperative epistaxis. Kameyama *et al.* (15) study found out that nasal application of lidocaine epinephrine mixture decreases nasal mucosa volume and blood flow, provides useful expansion of nasal cavity with less systemic hemodynamic effects in patients undergoing oro-maxillofacial surgeries.

In this study, the nasotracheal shaped tube of appropriate size was used for nasotracheal intubation (8). The type of the ETT also determines the degree of epistaxis associated with nasotracheal intubation. Ahmed-Nusrath *et al.* (2) did a randomised controlled trial in which they compared the frequency with which reinforced, preformed and thermosoftened preformed tubes pass through the upper and lower pathway and found out that reinforced tubes preferably take the lower pathway and preformed tubes frequently take upper pathway, thus causing more epistaxis. Prior *et al.* (16) studied the specifically designed posterior bevelled Parker Flex tip (PFT) tube with a side bevelled standard ETT for nasotracheal intubation. They showed that the PFT tube causes significantly less trauma and bleeding owing to its unique design and flexible quality of the distal end of an ETT. Takasugi *et al.* (17) did a study on thermophysical properties of thermosoftening tubes and found out that thermosoftening treatment of polyvinyl chloride (PVC) ETT effectively prevents epistaxis and impingement during nasotracheal intubation, and flexibility of PVC nasotracheal tube could be obtained by thermosoftening treatment at 600 degree Celsius without burn injury.

In this study, patients were intubated via direct laryngoscopy using a Macintosh laryngoscope blade and Magill forceps (8). The use of Magill forceps was not documented in this study. It may give an idea about the difficulty during the intubation process. Magill forceps is used to direct the nasotracheal tube tip towards the trachea, which usually courses posteriorly into the oesophagus without any aid. Magill forceps should be used cautiously as it may cause mucosal injury or rupture of endotracheal cuff or may cause infection. Use of stylet results in a higher chance of first-attempt intubation success in patients having difficult airway as compared with a bougie (18). Hu *et al.* (19) did a randomised controlled trial in which a comparison of Magill forceps and tube core for nasotracheal intubation in 60 patients undergoing maxillofacial surgery was made, and they find out that tube core was associated with less intubation time with no increase in epistaxis rate. Tube core is a disposable sterilised stylet that can be bent to the physiological curve of the nasal cavity.

The duration of nasotracheal intubation (primary outcome) and the number of intubation attempts (secondary outcome) are statistically lower in the nasopharyngeal airway group than the control group in this study. In a randomised controlled trial done by Dhakate *et al.* (3), it was observed that patients in the nasopharyngeal airway group had significant smooth insertion of an ETT through the nasopharynx with decreased incidence and severity of bleeding. Atraumatic dilatation of the nasal pathway by nasopharyngeal airway facilitates nasotracheal intubation (9). However, in a study done by Adamson *et al.* (7), repeated dilatation of nasal cavity with nasopharyngeal airway causes the friable nasal mucosa to bleed more, leading to increased haemorrhage in the nasopharyngeal dilated group during nasotracheal intubation. Mahajan *et al.* (20) have used a nasogastric tube as an internal stylet to avoid trauma during nasotracheal intubation. In a study done by Morimoto *et al.* (5), they did nasotracheal intubation under curved tip suction catheter guidance, and they observed that curved tip suction catheter guidance was associated with less nasal passage time and less nasal bleeding.

In conclusion, careful placement of lubricated nasopharyngeal airway facilitates nasotracheal intubation by atraumatic dilation of the nasal cavity. This technique should be combined with several other measures such as appropriate sized small ETT, prewarmed tube, vasoconstrictor use and selection of most patent nostril, reasonable force during tube advancement to decrease the associated complications of nasotracheal intubation.

Acknowledgments

Funding: None.

Footnote

Provenance and Peer Review: This article was commissioned by the editorial office, *Journal of Oral and Maxillofacial Anesthesia*. The article did not undergo external peer review.

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://joma.amegroups.com/article/view/10.21037/joma-21-24/coif). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

References

1. Prasanna D, Bhat S. Nasotracheal Intubation: An Overview. J Maxillofac Oral Surg 2014;13:366-72.
2. Ahmed-Nusrath A, Tong JL, Smith JE. Pathways through the nose for nasal intubation: a comparison of three endotracheal tubes. Br J Anaesth 2008;100:269-74.
3. Dhakate VR, Singam AP, Bharadwaj HS. Evaluation of Nasopharyngeal Airway to Facilitate Nasotracheal Intubation. Ann Maxillofac Surg 2020;10:57-60.
4. Thongrong C, Thaisiam P, Kasemsiri P. Validation of Simple Methods to Select a Suitable Nostril for Nasotracheal Intubation. Anesthesiol Res Pract 2018;2018:4910653.
5. Morimoto Y, Sugimura M, Hirose Y, et al. Nasotracheal intubation under curve-tipped suction catheter guidance reduces epistaxis. Can J Anaesth 2006;53:295-8.
6. Yamamoto T, Flenner M, Schindler E. Complications associated with nasotracheal intubation and proposal of simple countermeasure. Anaesthesiol Intensive Ther 2019;51:72-3.
7. Adamson DN, Theisen FC, Barrett KC. Effect of mechanical dilation on nasotracheal intubation. J Oral Maxillofac Surg 1988;46:372-5.
8. Canpolat DG, Orbay Yasli S. Does a Nasal Airway

Facilitate Nasotracheal Intubation or Not? A Prospective, Randomized, and Controlled Study. J Oral Maxillofac Surg 2021;79:89.e1-9.

9. Lewis JD. Facilitation of nasogastric and nasotracheal intubation with a nasopharyngeal airway. Am J Emerg Med 1986;4:426.
10. Atanelov Z, Aina T, Amin B, et al. Nasopharyngeal Airway. StatPearls. Treasure Island, FL, USA: StatPearls Publishing, 2021.
11. Tan YL, Wu ZH, Zhao BJ, et al. For nasotracheal intubation, which nostril results in less epistaxis: right or left?: A systematic review and meta-analysis. Eur J Anaesthesiol 2021;38:1180-6.
12. Cho HS, Yang HS, Lee SY, et al. The Significance of Rhinologic Evaluation and Pretreatment for Patients Undergoing Two-Jaw Surgery Through Nasotracheal Intubation. J Craniofac Surg 2016;27:74-7.
13. Patel S, Hazarika A, Agrawal P, et al. A prospective randomized trial of xylometazoline drops and epinephrine merocele nasal pack for reducing epistaxis during nasotracheal intubation. J Dent Anesth Pain Med 2020;20:223-31.
14. Song J. A comparison of the effects of epinephrine and xylometazoline in decreasing nasal bleeding during nasotracheal intubation. J Dent Anesth Pain Med 2017;17:281-7.
15. Kameyama K, Watanabe S, Kano T, et al. Effects of nasal application of an epinephrine and lidocaine mixture on the hemodynamics and nasal mucosa in oral and maxillofacial surgery. J Oral Maxillofac Surg 2008;66:2226-32.
16. Prior S, Heaton J, Jatana KR, et al. Parker flex-tip and standard-tip endotracheal tubes: a comparison during nasotracheal intubation. Anesth Prog 2010;57:18-24.
17. Takasugi Y, Futagawa K, Umeda T, et al. Thermophysical Properties of Thermosoftening Nasotracheal Tubes. Anesth Prog 2018;65:100-5.
18. Driver BE, Prekker ME, Klein LR, et al. Effect of Use of a Bougie vs Endotracheal Tube and Stylet on First-Attempt Intubation Success Among Patients With Difficult Airways Undergoing Emergency Intubation: A Randomized Clinical Trial. JAMA 2018;319:2179-89.
19. Hu R, Niu JY, Wu LN, et al. Comparison of a tube core and Magill forceps for nasotracheal intubation: a randomised controlled trial. Trials 2021;22:697.
20. Mahajan R, Gupta R, Sharma A. Proper utility of the nasogastric tube in assisting nasotracheal intubation. Acta Anaesthesiol Scand 2007;51:649-50.

doi: 10.21037/joma-21-24
Cite this article as: Garg K, Singh A, Soni SL. Editorial commentary: "*Does a Nasal Airway Facilitate Nasotracheal Intubation or Not?*" J Oral Maxillofac Anesth 2022;1:23.